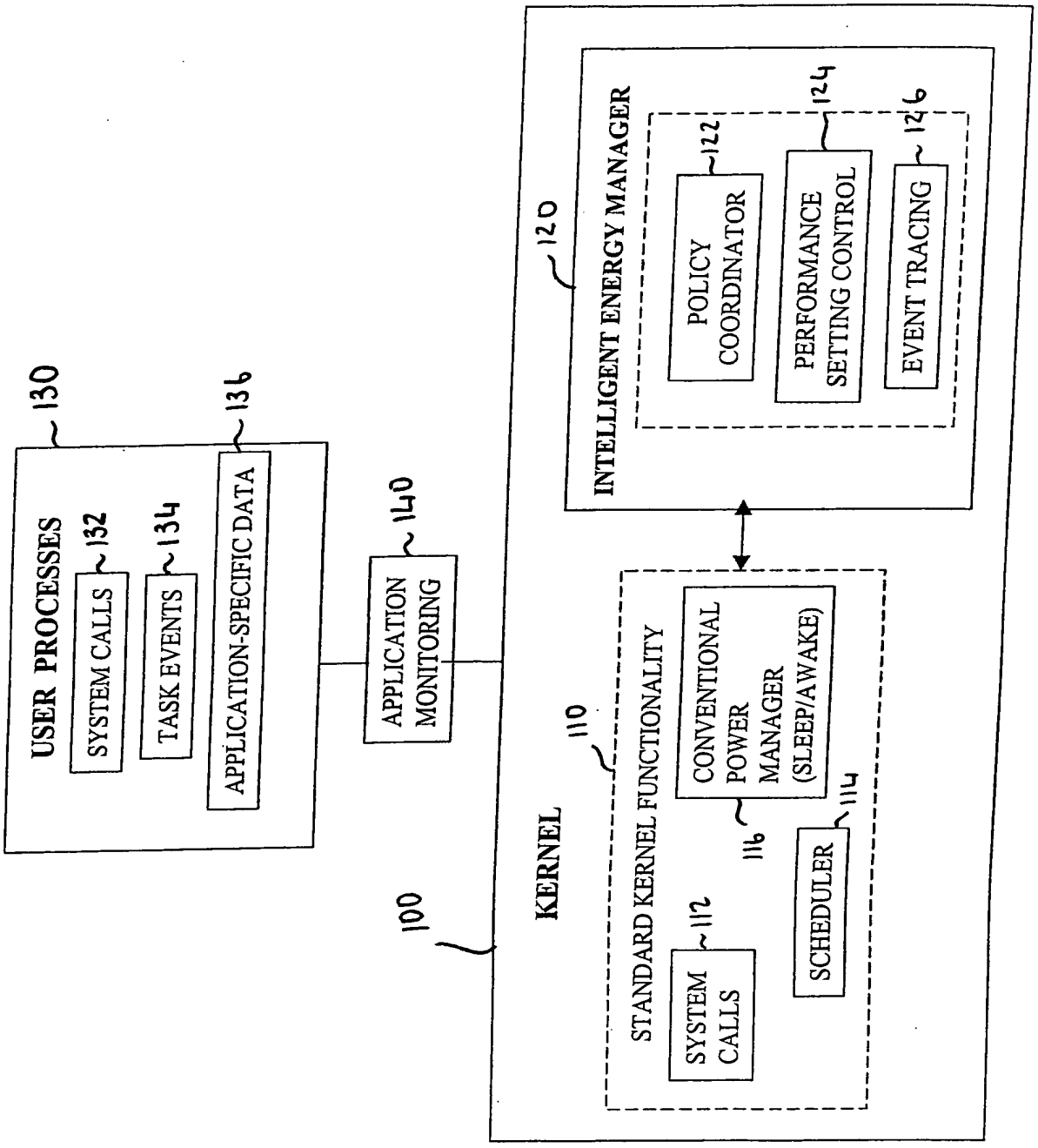

FIGURE 1

BEST AVAILABLE COPY

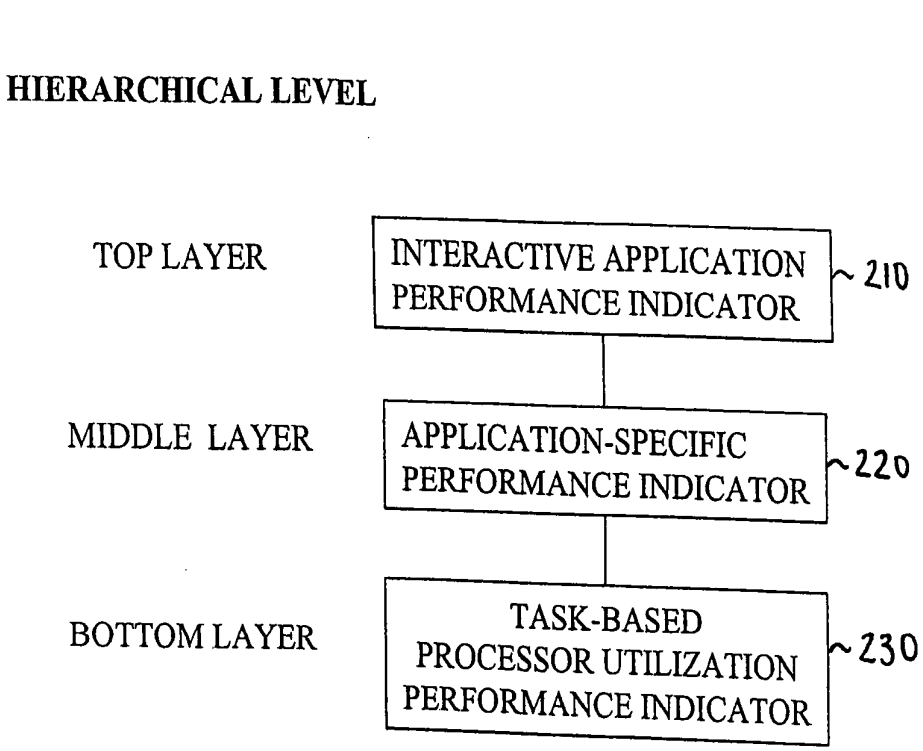
HIERARCHICAL LEVEL
TOP LAYER
INTERACTIVE APPLICATION PERFORMANCE INDICATOR
210
MIDDLE LAYER
APPLICATION-SPECIFIC PERFORMANCE INDICATOR
220
BOTTOM LAYER
TASK-BASED PROCESSOR UTILIZATION PERFORMANCE INDICATOR
230

FIGURE 2

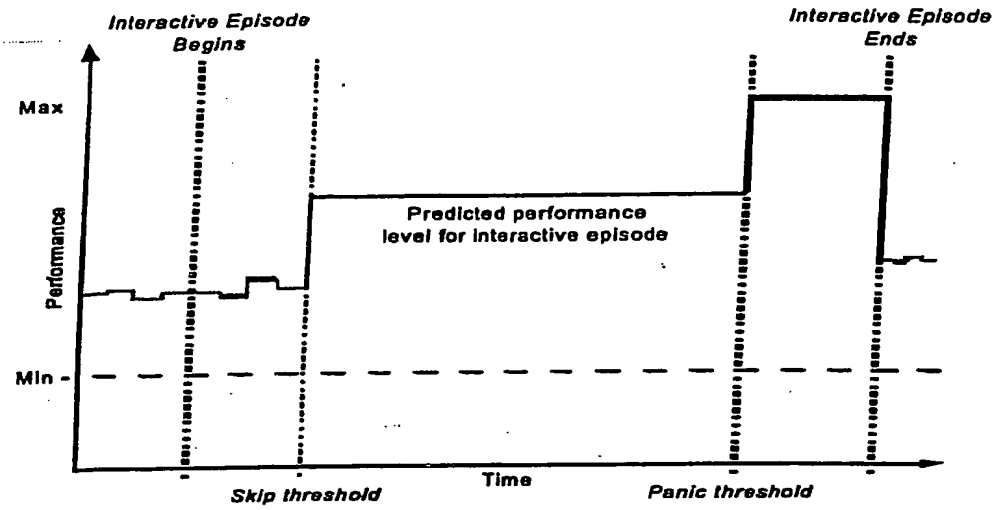
Interactive Episode Begins
Interactive Episode Ends
Max
Performance
Min
Predicted performance level for interactive episode
Time
Skip threshold
Panic threshold

FIGURE 3

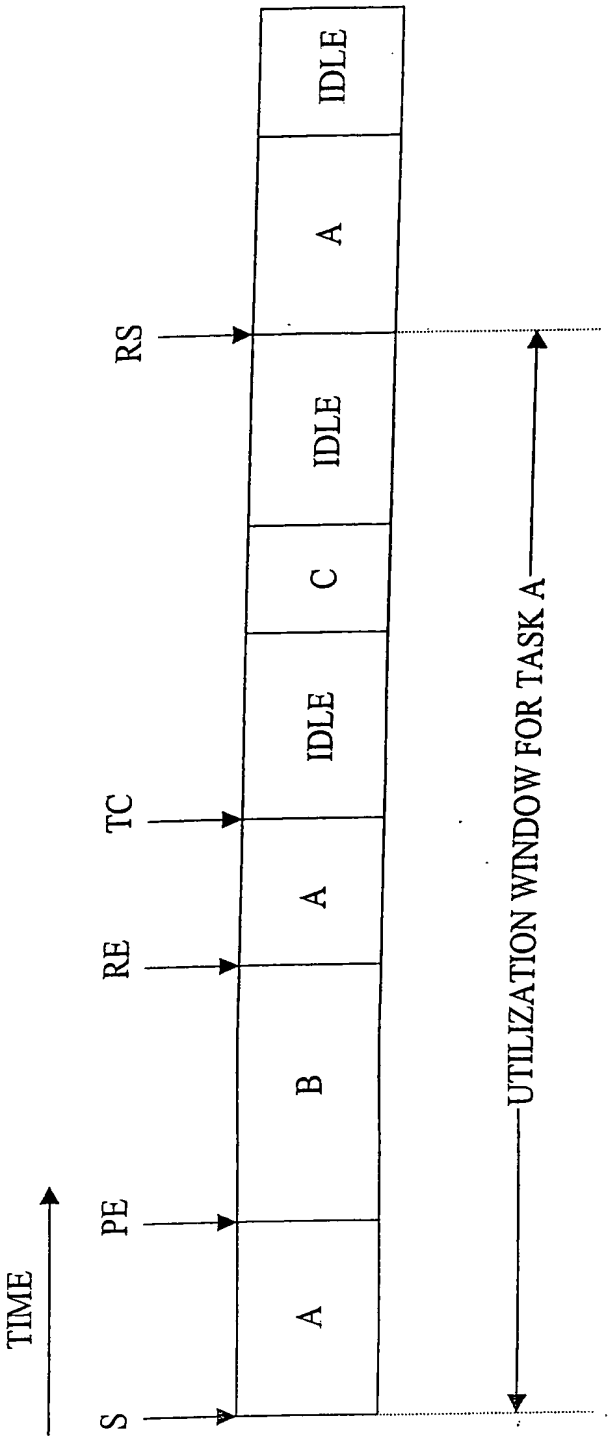
TIME
S
PE
RE
TC
RS
A
B
A
IDLE
C
IDLE
A
IDLE
UTILIZATION WINDOW FOR TASK A

FIGURE 4

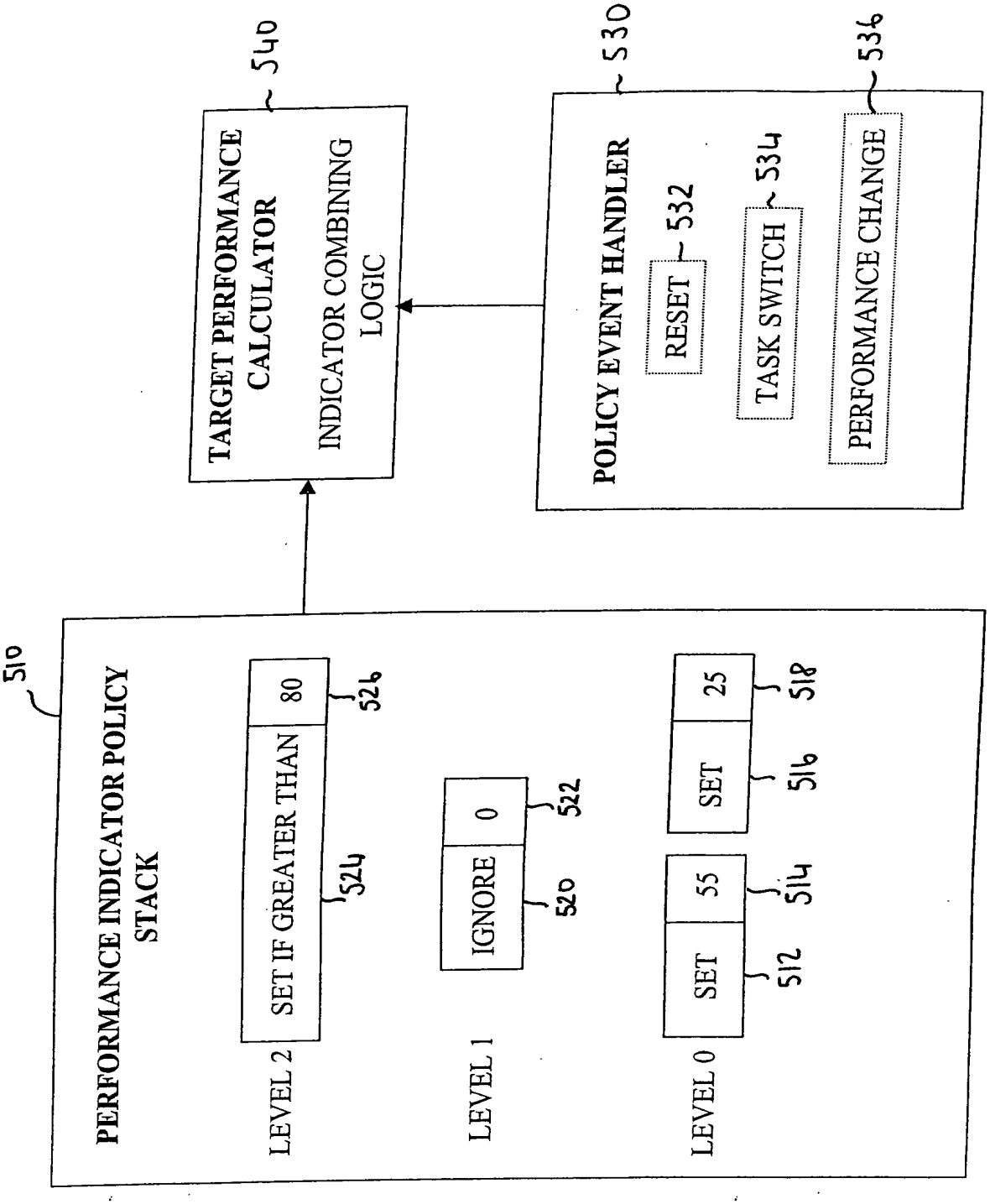
510
PERFORMANCE INDICATOR POLICY STACK
LEVEL 2
SET IF GREATER THAN
80
524
526
LEVEL 1
IGNORE
0
520
522
LEVEL 0
SET
55
512
514
SET
25
516
518
TARGET PERFORMANCE CALCULATOR
INDICATOR COMBINING LOGIC
540
POLICY EVENT HANDLER
530
RESET
532
TASK SWITCH
534
PERFORMANCE CHANGE
536

FIGURE 5

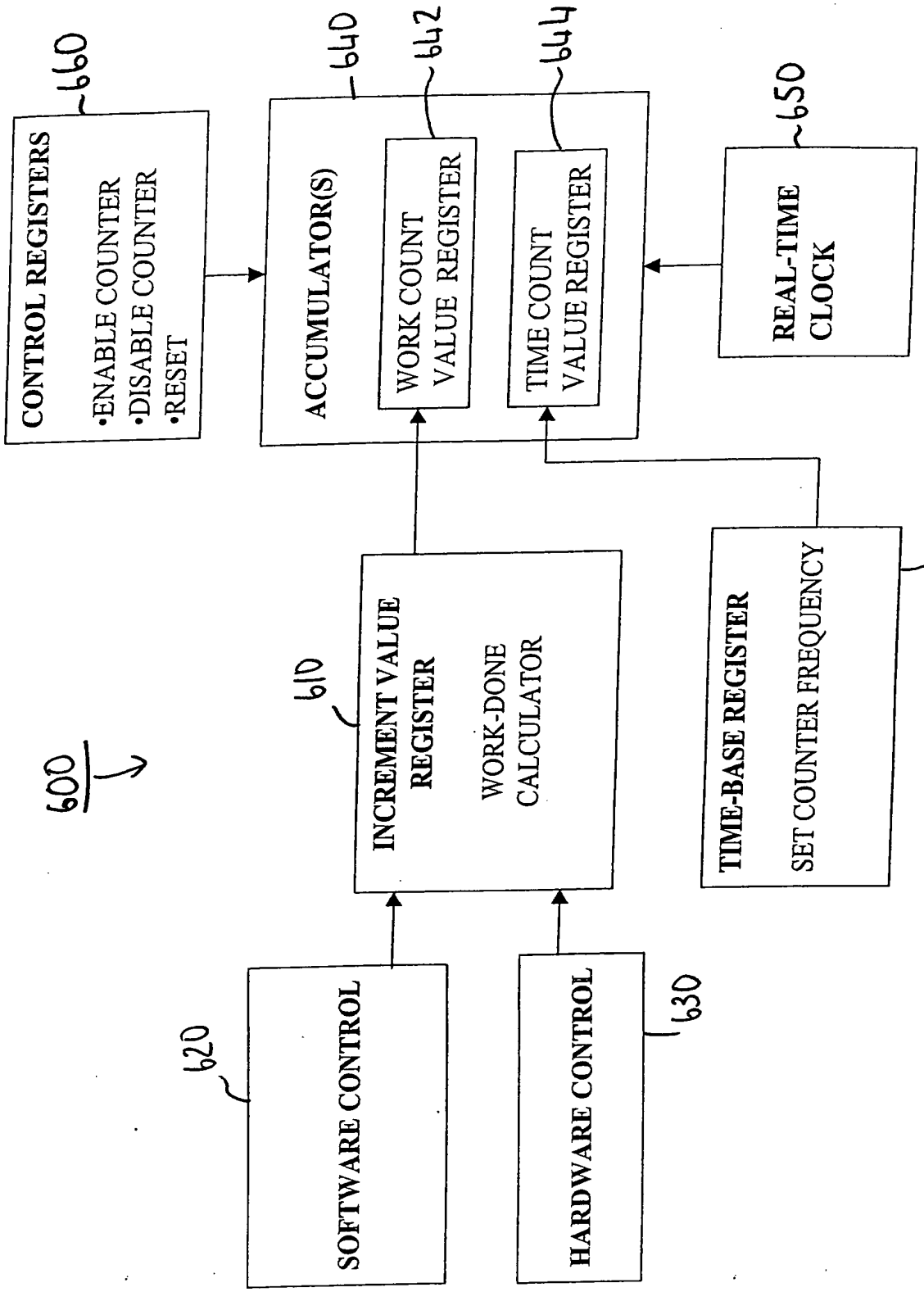
600
CONTROL REGISTERS
•ENABLE COUNTER
•DISABLE COUNTER
•RESET
660
ACCUMULATOR(S)
640
WORK COUNT VALUE REGISTER
642
TIME COUNT VALUE REGISTER
644
REAL-TIME CLOCK
650
INCREMENT VALUE REGISTER
WORK-DONE CALCULATOR
610
TIME-BASE REGISTER
SET COUNTER FREQUENCY
646
SOFTWARE CONTROL
620
HARDWARE CONTROL
630

FIGURE 6

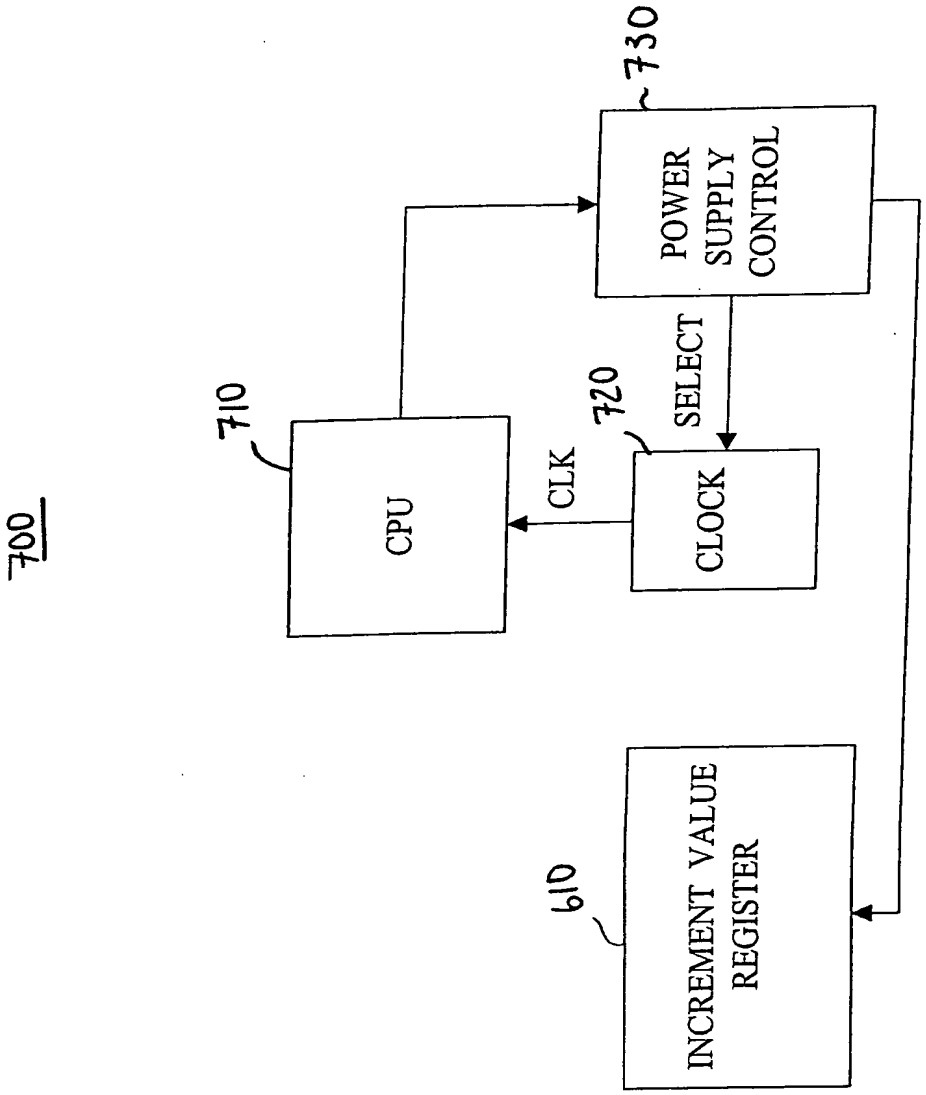
700
710
CPU
CLK
720
CLOCK
SELECT
730
POWER SUPPLY CONTROL
610
INCREMENT VALUE REGISTER

FIGURE 7

		Execution statistics			MPEG decode	
		Length (s)	Idle	Sleep	Ahead (s)	Exactly on time
Danse De Cable	LongRun	247.1	54%	23%	148.10	6
320x160 +audio	Present Technique		27%	4%	68.74	1012
Legendary	LongRun	19.4	33%	13%	7.20	19
352x240 +audio	Present Technique		24%	7%	4.79	65
Red's Nightmare	LongRun	49.1	48%	36%	26.31	5
320x240	Present Technique		32%	13%	16.53	74
Red's Nightmare	LongRun	49.3	22%	15%	12.48	87
480x360	Present Technique		18%	11%	8.17	139
Roadkill Turtle	LongRun	121.3	46%	19%	64.93	5
304x240 +audio	Present Technique		25%	4%	33.34	237
Sentinel	LongRun	35.6	28%	10%	11.05	80
320x240 +audio	Present Technique		19%	5%	6.32	231
SpecialOps	LongRun	60.8	30%	11%	19.01	129
320x240 +audio	Present Technique		20%	5%	12.67	305

FIGURE 8

	LongRun					Present Technique					Mean performance reduction over LongRun
	Fraction of time at each performance level (Mhz)				Mean perf level	Fraction of time at each performance level (Mhz)				Mean perf level	
	300	400	500	600		300	400	500	600		
Danse De Cable	6%	19%	33%	54%	89%	51%	48%	0%	0%	59%	34%
Legendary	0%	3%	17%	79%	96%	0%	8%	88%	4%	82%	15%
Red's Nightmare small	11%	35%	35%	19%	80%	95%	2%	0%	3%	52%	35%
Red's Nightmare big	0%	5%	21%	74%	95%	0%	0%	90%	10%	85%	11%
Roadkill Turtle	3%	10%	23%	64%	92%	1%	97%	1%	0%	66%	28%
Sentinel	0%	0%	14%	86%	97%	0%	0%	93%	7%	84%	13%
SpecialOps	1%	2%	14%	83%	96%	0%	2%	93%	4%	83%	14%

FIGURE 9

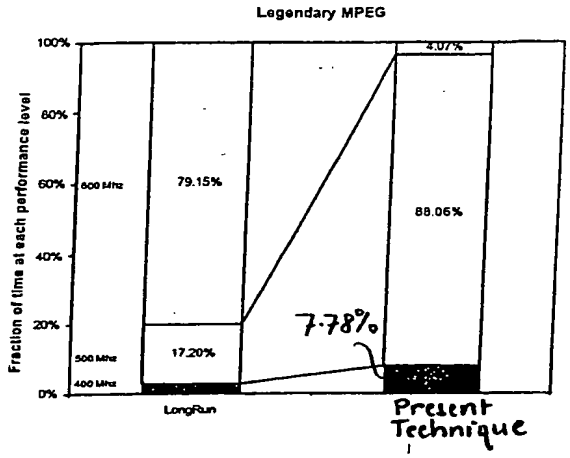

FIGURE 10A

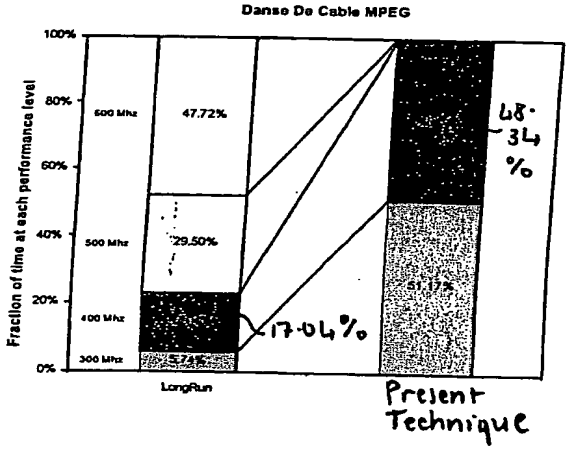

FIGURE 10B

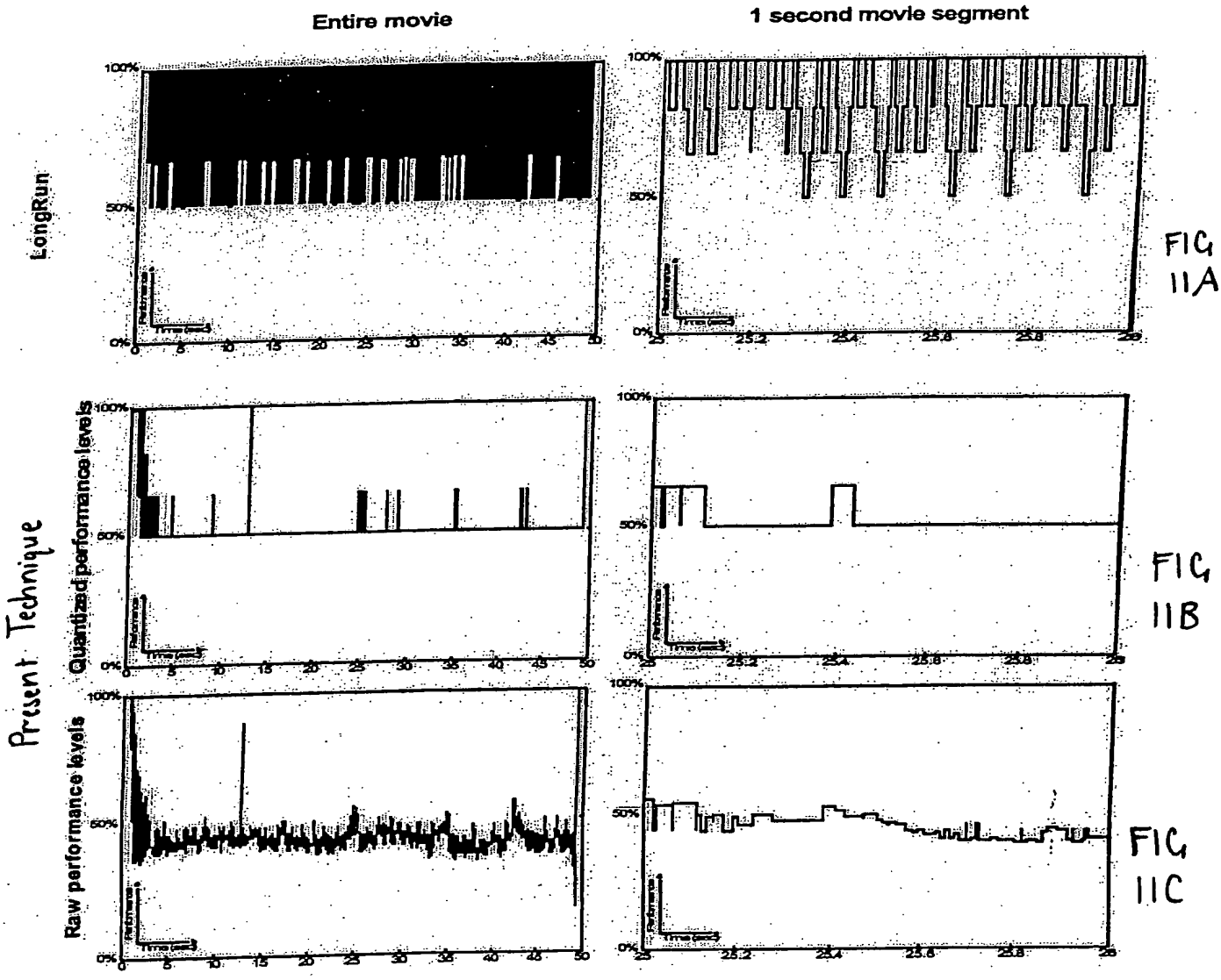

FIG 11A

FIG 11B

FIG 11C

FIGURE 11

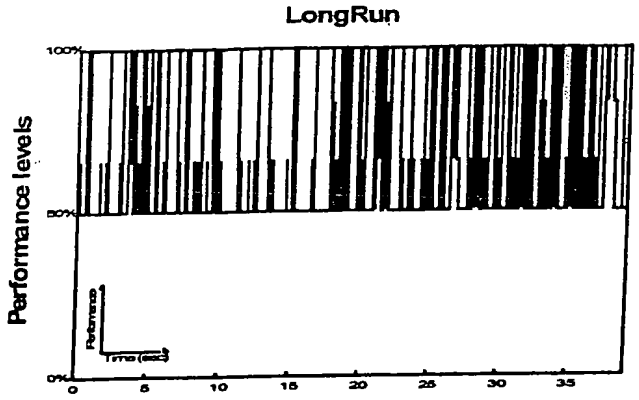

FIGURE 12A

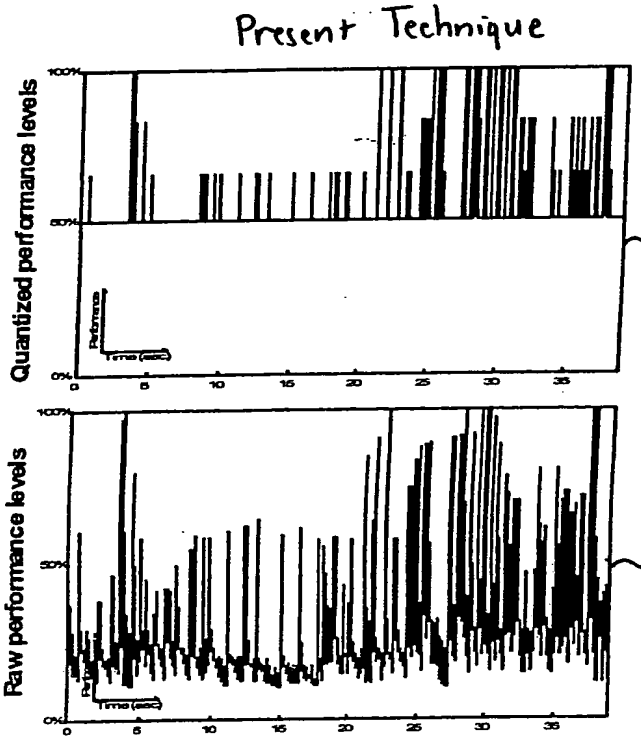

FIGURE 12B

FIGURE 12C

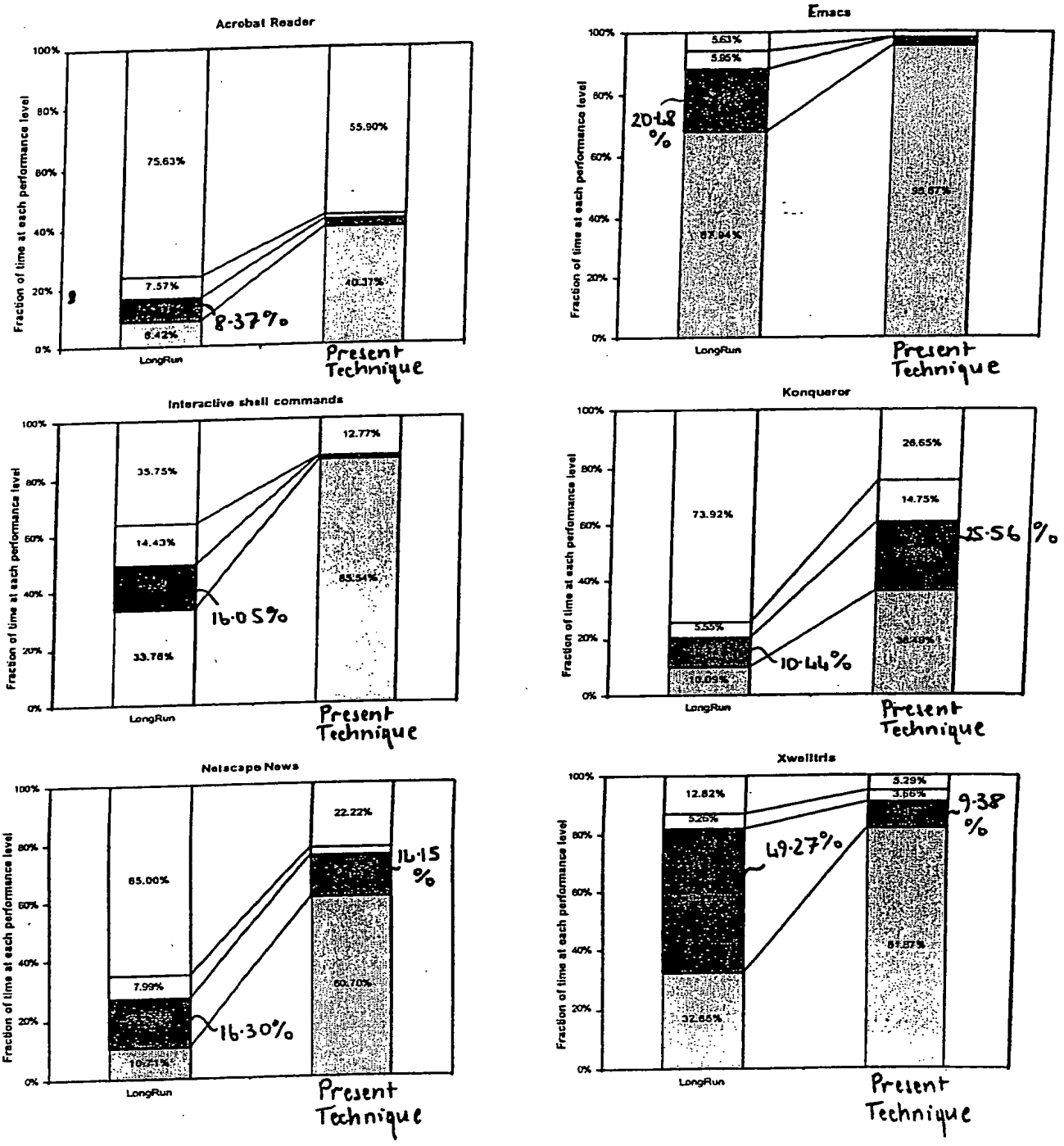
Acrobat Reader
Fraction of time at each performance level
100%
80%
60%
40%
20%
0%
75.63%
7.57%
8.42%
55.90%
40.17%
8.37%
LongRun
Present Technique
Emacs
5.63%
5.95%
20.48 %
55.87%
LongRun
Present Technique
Interactive shell commands
35.75%
14.43%
33.78%
12.77%
16.05%
LongRun
Present Technique
Konqueror
73.92%
5.55%
10.09%
26.65%
14.75%
25.56 %
10.46%
LongRun
Present Technique
Netscape News
65.00%
7.99%
10.21%
22.22%
16.15 %
16.30%
LongRun
Present Technique
Xwelltris
12.82%
5.25%
32.65%
5.29%
3.86%
9.38 %
49.27%
LongRun
Present Technique

FIGURE 13

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